



Swedish Innovative Servo Motion  
Engineering Since 1994



## HDD 09E - Data sheet

### Electric data

Value	Unit	Winding		
		Pa (400VAC)	Ma (230VAC)	Fa (48V)
Number of poles		20	20	20
Number of pole pairs		10	10	10
Inductance/Phase	mH	19	3.4	0.094
Resistance/Phase	Ohm	15	2.5	0.074
Resistance/Phase-Phase	Ohm	30	5.0	0.15
Back EMF/Phase-Phase RMS	Vs/rad	0.71	0.30	0.05
Back EMF @ 1000 rpm	V	74	31	5.2
Torque constant (RMS)	Nm/A	1.22	0.52	0.086
Max rail voltage	V	750	750	750
Recommended peak current	A	3	7	43
Torque at recommended peak current	Nm	3.1	3.1	3.1

For higher torques, see next page.

### Mechanical data (resolver feedback)

Value	Unit	HDD09E	
		no brake	brake
J	kgcm <sup>2</sup>	1.3	1.7
Mass	kg	1.8	2.4

### Holding brake

Value	Unit	
Torque	Nm	9
J	kgcm <sup>2</sup>	0.4
Voltage	V DC	24
Power	W	12

### Thermistors

Overheat protection consists of triple PTC thermistors.  
One on each phase.

R @ 25 C	100 to 350 Ohm
R @ 145 C	< 1650 Ohm
R @ 155 C	> 4 kOhm

### Protection class

HDD motors comply with the requirements for IP 65. IP-67 is available on request.

### Insulation class

The insulation system complies with the requirements of EEC LV Directive 73/23/EEC and 93/68/EEC. Test report E9911111E01.

### Motor name structure

Type	Flange size	Stator length	Winding	Feedback	Power connector	Brake	Shaft key	Options
HDD	09	E	-Pa	-A	-A	-A	-A	-AAA

#### Type

HDD = shaft motor, ICM = internal coupling motor.

#### Flange size

Approximate in cm. 09 = 92 mm.

#### Stator length

HDD: E (shortest), J, N, Q, S (longest), ICM: J (shortest), N (longest).

#### Winding

Suitable rail voltage at 3000 rpm.

Pa	560V
Ma	320V
Fa	48V

#### Feedback

See the feedback list on [www.hddservo.com/product-options/](http://www.hddservo.com/product-options/)

#### Power connector

Many different pinouts available; see [www.hddservo.com/product-options/](http://www.hddservo.com/product-options/)

#### Brake

A = no brake, D = holding brake. Data see above.

#### Shaft key

A = shaft with key, B = shaft without key.

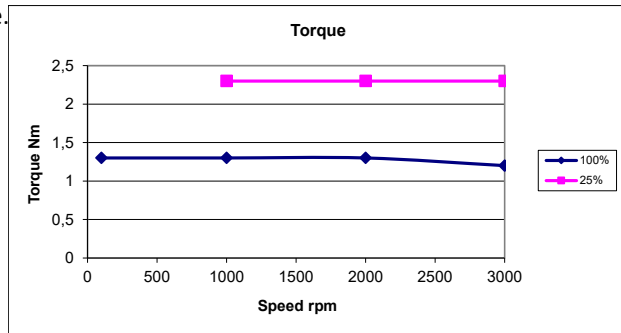
#### Options

AAA = standard. For other options please contact HDD.

## Torque

Torque in Nm at 90°C temp rise (median temp rise, i.e. average between min and max temp for 25% cycle).

Duty cycle	100%	25%
Locked rotor	1.0	
100rpm	1.3	
1000rpm	1.3	2.3
2000rpm	1.3	2.3
3000rpm	1.2	2.3



## Current

Current at 90°C temp rise, in Ampere rms.

Winding	Pa	Ma	Fa	Pa	Ma	Fa
	100%			25%		
Locked rotor	0.9	2.2	13			
100rpm	1.2	2.8	17	2.25	5.3	49
1000rpm	1.2	2.8	17	2.25	5.3	49
3000rpm	1.2	2.7	16	2.25	5.3	47

Data were measured on an HDD 09E-Pa series motor mounted on a vertical 260 x 200 x 12 mm aluminum plate in free air, with a winding temperature rise of 90°C and driven by a commercially available inverter.

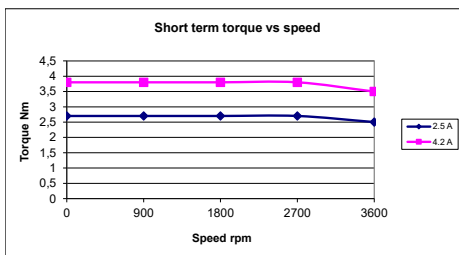
Data for Ma and Fa windings are calculated.

## Important note on peak torque and currents

The HDD/ICM motors are capable of high peak torques. At very high peak torques the permitted pulse time is very limited as a high current in a very small motor causes rapid temperature rise in the copper winding. The protection thermistor will not react fast enough to protect the winding during high pulse loads. A 4.2 A rms current to a HDD09E-Pa will give some 3.8 Nm, but the copper winding temperature will increase with some 47°C per second. This is not a problem for short pulses of < 0.5 seconds as long as the rms value of the current is kept below some 1.3 A.

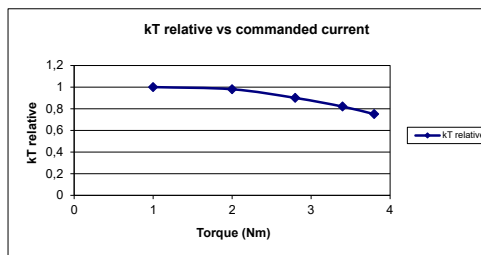
## Torque at various commanded currents

HDD 09E-Pa at 560V rail voltage



## kT derating factor

Low speed, HDD09E-Pa



## Maximum load on shaft at life expectancy 20,000 h (shaft motors only)

Maximal axial load (push): 350 N at 500 rpm, 100 N at 3000 rpm. Maximal axial load (pull): 50 N at all speeds.

Maximal radial load at zero axial load is given by the curves below. For special cases please contact HDD for calculations.

